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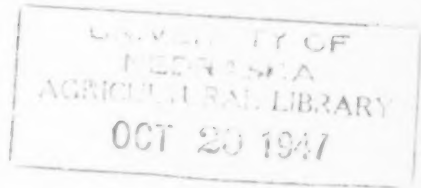
# American Potato Journal

Volume 24

SEPTEMBER, 1947

Number 9

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PUBLISHED MONTHLY AT

THE POTATO ASSOCIATION OF AMERICA

New Brunswick, New Jersey

Subscription Price \$2.00 Per Year

Entered as second class matter at New Brunswick, N. J., March 14, 1942, under Act of March 3, 1879.

Accepted for mailing at special rate of postage provided for in section 412. Act of February 26, 1925, authorized on March 14, 1928.



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# American Potato Journal

PUBLISHED BY

THE POTATO ASSOCIATION OF AMERICA

NEW BRUNSWICK, N. J.

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## STUDIES ON POTATO NUTRITION III. CHEMICAL COMPOSITION AND UPTAKE OF NUTRIENTS BY KERN COUNTY POTATOES<sup>1</sup>

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### INTRODUCTION

Previous publications, (1), (2), presented certain information regarding the effect of fertilizer treatment and time of sampling on chemical composition and nutrient uptake by potatoes grown in Kern County, California. This paper presents similar but more complete results gathered from plantings made during 1945 and 1946.

### METHODS

The potatoes were grown at the U. S. Cotton Experiment Station at Shafter on a Hesperia fine, sandy loam soil. Comparisons were made of potatoes grown with four different fertilizer treatments namely: none, 50 pounds, and 100 pounds of nitrogen per acre from ammonium sulfate and a fourth treatment containing the highest rate of nitrogen in addition to 125 pounds each of phosphoric acid and potash. These treatments should fairly well represent the extremes in composition and nutrient uptake by potatoes grown in this area. The fertilizer was placed by an

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<sup>1</sup>The author acknowledges his indebtedness to Mr. George J. Harrison, Agronomist, U. S. Cotton Field Station, Shafter, California, for providing the land and for aid in the growing and harvesting of the potatoes and to Mr. James Perdue and Mas Yamaguchi of the Division of Truck Crops, University of California, for aid in the chemical analysis.

experimental machine two inches to one side and two inches below the seed piece at planting. The rows were spaced 30 inches apart. The seed pieces were planted by hand approximately seven inches deep and were spaced exactly one foot apart in the row. Samples for growth and chemical analysis consisted of ten hills from each of duplicate plots of each fertilizer treatment except for the final sampling at time of harvest where the weights recorded were obtained from a larger fertilizer experiment and represent the average of two rows per plot each 125 feet long. Each plot was replicated four times. The last tuber yields reported would thus be more accurate than those obtained from the smaller plots harvested earlier. Tubers were separated from the remainder of the plant and analyzed separately. Since the soil was of very light texture, many of the small fibrous roots and small stolons were recovered. Methods of analysis were those of A. O. A. C., except for potassium which was determined volumetrically by the Cobaltinitrite method.

Certified seed of the White Rose variety was planted on the 19th of February, 1945, and on the 14th of February, 1946. In both years 95 per cent emergence was noted approximately 30 days after planting. Sampling was begun when the plants were about six inches high and was continued at approximately two-week intervals until harvest which was on the 18th of June during both years. Daily irrigations in alternate furrows were begun about two weeks after plant emergence and continued until one week before harvest. There was practically no tuber growth previous to one month after emergence although enlargements at the ends of the stolons were noted soon after plant emergence. During the last two weeks of growth some of the leaves became mature, dried up, and dehisced. This accounts for the lower amount of plant growth at the last sampling than sometimes reported for slightly earlier samplings. Potatoes grown in this area are often harvested at about 100 days after planting as compared with growing periods of 119 and 124 days reported here. In both years the tubers were quite well matured at the time of harvest, however those grown on the plots lacking nitrogen were the most mature.

### RESULTS

Tables 1, 2, and 3 present data on the effect of fertilizer treatment and time of sampling on nutrient and dry-matter content.

#### *Nitrogen*

In plants of the 1945 crop the nitrogen content decreased approximately one-half from the first sampling to the last. The decrease was somewhat greater in the nitrogen-fertilized plants than in those unfer-

TABLE 1.—*Effect of fertilizer treatment and time of sampling on nutrient content of potatoes, 1945 crop.*

Date of Sampling	Portion Sampled	Fertilizer Treatments — Pound per Acre of N, P <sub>2</sub> O <sub>5</sub> , and K <sub>2</sub> O Respectively											
		0 — 0 — 0				50 — 0 — 0				100 — 0 — 0			
		Per cent of Dry Weight											
		N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O
4-20	Plant Tuber	5.48 —	0.98 —	6.1 —	6.06 —	1.11 —	6.9 —	6.37 —	1.12 —	6.6 —	6.23 —	1.65 —	6.8 —
5-3	Plant Tuber	3.69 1.78	0.73 0.76	7.1 3.6	5.80 2.50	0.34 0.73	6.6 3.8	5.90 2.67	0.34 0.67	6.6 3.6	5.64 2.43	0.53 1.10	6.6 3.6
5-18	Plant Tuber	3.01 1.25	0.77 0.41	6.0 2.8	3.92 1.50	0.66 0.32	5.1 2.8	4.04 1.61	0.45 0.34	5.6 2.6	4.03 1.45	0.66 0.53	5.0 2.6
6-1	Plant Tuber	3.01 1.06	0.44 0.47	5.4 2.7	2.67 1.10	0.30 0.32	4.0 2.3	2.94 1.22	0.26 0.42	3.8 2.4	2.62 1.21	0.33 0.39	3.6 2.4
6-18	Plant Tuber	2.41 1.14	0.34 0.47	4.3 2.7	2.39 1.13	0.29 0.32	3.8 1.7	2.64 1.37	0.36 0.31	3.5 2.2	2.38 1.27	0.37 0.34	3.5 1.8

TABLE 2.—*Effect of fertilizer treatment and time of sampling on nutrient content of potatoes. 1946 crop.*

Fertilizer Treatments — Pound per Acre of N, P <sub>2</sub> O <sub>5</sub> , and K <sub>2</sub> O Respectively													
0 — 0 — 0			50 — 0 — 0			100 — 0 — 0			100 — 125 — 125				
Per cent of Dry Weight													
Date of Sampling	Portion Sampled	N		P <sub>2</sub> O <sub>5</sub>		K <sub>2</sub> O		N		P <sub>2</sub> O <sub>5</sub>		K <sub>2</sub> O	
4-20	Plant Tuber	3.76	.68	5.8	.87	6.0	.98	5.91	6.33	6.0	.98	5.91	5.6
		2.11	.70	3.2	.72	3.0	.83	2.57	2.91	2.9	.83	2.57	3.2
5-1	Plant Tuber	3.43	.48	5.8	.68	5.1	.67	4.84	4.80	6.4	.67	4.84	6.5
		1.19	.40	3.1	.51	3.1	.52	1.74	1.78	2.9	.52	1.74	2.9
5-16	Plant Tuber	2.87	.31	5.5	.31	5.2	.27	3.25	3.00	4.9	.27	3.25	4.7
		1.16	.25	2.4	.28	2.4	.27	1.22	1.30	2.4	.27	1.22	2.3
6-1	Plant Tuber	2.90	.41	4.6	.25	4.6	.26	2.78	2.64	4.6	.26	2.78	4.8
		1.26	.29	2.5	.22	2.2	.23	1.15	1.17	2.2	.23	1.15	2.5
6-11	Plant Tuber	2.90	.46	5.3	.31	4.1	.24	2.34	2.22	3.9	.24	2.34	3.3
		1.31	.33	2.5	.26	2.2	.22	1.08	1.05	1.9	.22	1.08	1.8
6-18	Plant Tuber	2.72	.45	5.0	.34	4.0	.20	1.81	1.73	3.2	.20	1.81	3.0
		1.27	.32	3.0	.31	2.2	.25	1.10	1.10	2.1	.25	1.10	2.0

TABLE 3.—Effect of fertilizer treatment and time of sampling on dry matter content of potatoes.

Portion Sampled	1945 Crop				1946 Crop					
	Date of Sampling	Fertilizer Treatment — Pounds per Acre of N, P <sub>2</sub> O <sub>5</sub> , K <sub>2</sub> O			Date of Sampling	Fertilizer Treatment — Pounds per Acre of N, P <sub>2</sub> O <sub>5</sub> , K <sub>2</sub> O				
		0-0-0	50-0-0	100-0-0		100-125-125	0-0-0	50-0-0	100-0-0	100-125-125
		Dry Weight as per cent of Fresh					Dry Weight as per cent of Fresh			
Plant Tuber	4-20	9.6 —	9.1 —	8.8 —	4-20	14.5 14.6	11.9 13.4	11.6 12.8	11.9 12.4	
Plant Tuber	5-3	12.5 11.6	11.2 10.8	11.1 11.0	5-1	13.7 13.5	11.2 12.5	11.4 12.9	10.6 12.6	
Plant Tuber	5-18	14.3 15.7	14.2 16.3	12.8 15.3	5-16	17.7 18.3	15.0 18.2	15.3 18.3	14.9 18.2	
Plant Tuber	6-1	16.9 18.3	17.6 19.0	15.6 18.8	6-1	20.0 18.9	17.5 21.3	15.1 21.3	14.5 20.8	
Plant Tuber	6-18	16.0 22.2	15.6 23.5	15.8 22.6	6-11	20.3 19.3	18.2 21.8	16.6 22.4	15.5 23.2	
Plant Tuber					6-18	30.6 20.4	30.3 22.5	31.6 23.8	26.5 24.3	

tilized. Plants that received nitrogen fertilizer were appreciably higher in nitrogen content than those unfertilized but in mature plants there was little or no difference. The nitrogen content of the tubers also decreased with maturity. Tubers grown on plots receiving nitrogen fertilizer were considerably higher in nitrogen content during early growth but in mature tubers there was very little difference. At the time of field harvest (119 days after planting) tubers grown on unfertilized plots contained 1.14 per cent N as compared with 1.13 and 1.37 per cent for those grown on plots given 50 and 100 pounds of nitrogen per acre, respectively.

The 1946 crop showed similar decreases in nitrogen content with maturity. Plants and tubers grown without nitrogen were lower in nitrogen content during the early stages of growth than those receiving nitrogen fertilizer but at maturity were even higher.

#### *Phosphorus*

The phosphorus content of both plants and tubers showed a marked decrease from early growth until maturity. In the young plants and tubers there was a marked increase in phosphorus content due to phosphate fertilization but in mature plants and tubers there was either no difference or only a slight increase. In 1945 tubers at final harvest contained 0.34 per cent  $P_2O_5$  when grown on phosphorus-fertilized plots as compared with 0.31 per cent if grown with equal amounts of nitrogen and potassium but lacking phosphorus. In 1946 comparable figures were 0.33 and 0.25 per cent  $P_2O_5$ .

#### *Potassium*

The potassium content of both plants and tubers decreased with age. Potash applications had no effect on the potassium content of either plants or tubers at any stage of growth. Mature tubers grown on the potash-treated plots contained 1.8 per cent  $K_2O$  in 1945 and 2.0 per cent in 1946.

#### *Dry Matter*

The dry-matter content of both plants and tubers was much less in the early stages of growth than later. The tubers showed a gradual increase in dry matter from the first sampling until the time of harvest. In mature tubers of the 1945 crop there was no effect of fertilizer treatment on total dry matter but in 1946 tubers produced on plots receiving nitrogen fertilizer were several per cent higher than those grown without nitrogen. Conversely in the 1946 crop during the early stages of growth tubers grown on the unfertilized plots were the highest in dry matter. The large increase in dry matter as the plants and tubers matured ac-

TABLE 4.—Effect of fertilizer treatment and time of sampling on growth and nutrient absorption by an acre of potatoes. Unfertilized plots.

Portion Sampled	1945 Crop					1946 Crop						
	Date of Sampling	Growth—Pounds per Acre		Nutrients Absorbed Pounds per Acre			Date of Sampling	Growth—Pounds per Acre		Nutrients Absorbed Pounds per Acre		
		Fresh Weight	Dry Weight	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O		Fresh Weight	Dry Weight	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O
Plant Tubers Total	4-20 (60)*	826 — 826	79 — 79	4.3 — 4.3	0.8 — 0.8	4.8 — 4.8	4-20 (65)*	1467 826 2293	213 121 334	8.0 2.6 10.6	1.5 0.9 2.4	12.4 4.0 16.4
Plant Tubers Total	5-3 (73)	2546 843 3389	317 98 415	11.7 1.7 13.4	2.3 0.7 3.0	22.7 3.6 26.3	5-1 (76)	3203 4721 7924	438 638 1076	15.0 7.6 22.6	2.1 2.6 4.7	25.5 19.4 44.9
Plant Tubers Total	5-18 (88)	4552 6913 11405	649 1081 1730	19.5 13.5 33.0	5.0 4.5 9.5	38.9 30.9 69.8	5-16 (91)	2951 9610 12561	521 1754 2275	15.0 20.4 35.4	1.6 4.4 6.0	28.8 42.9 71.7
Plant Tubers Total	6-1 (102)	5142 10200 15342	867 1871 2738	26.1 19.8 45.9	3.8 8.8 12.6	47.3 51.4 98.7	6-1 (107)	3777 13235 17012	756 2507 3263	21.9 31.6 53.5	3.1 7.2 10.3	35.2 61.9 97.1
Plant Tubers Total	6-18 (119)	6828 13100 19928	1091 2903 3994	26.3 33.1 59.4	3.7 13.6 17.3	47.3 79.0 126.3	6-11 (117)	4906 16573 21479	997 3205 4202	28.9 42.0 70.9	4.6 10.7 15.3	53.5 79.9 133.4
Plant Tubers Total							6-18 (124)	2495 16500 18995	763 3364 4127	20.8 42.7 63.5	3.4 10.9 14.3	37.9 100.5 138.4

\*Figures in parenthesis refer to number of days after planting.

TABLE 5.—Effect of fertilizer treatment and time of sampling on growth and nutrient absorption by an acre of potatoes. Fertilized with 50-0-0 pounds per acre of N, P<sub>2</sub>O<sub>5</sub>, and K<sub>2</sub>O, respectively.

Portion Sampled	1945 Crop				1946 Crop			
	Date of Sampling	Growth—Pounds per Acre		Nutrients Absorbed Pounds per Acre	Date of Sampling	Growth—Pounds per Acre		Nutrients Absorbed Pounds per Acre
		Fresh Weight	Dry Weight			Fresh Weight	Dry Weight	
Plant Tubers Total	4-20 (60)*	1062	97	N 5.9 P <sub>2</sub> O <sub>5</sub> 1.1 K <sub>2</sub> O 6.6	4-20 (65)*	3726	443	N 20.9 P <sub>2</sub> O <sub>5</sub> 3.9 K <sub>2</sub> O 26.7
Plant Tubers Total	5-3 (73)	4560 804 5463	514 97 611	N 20.8 P <sub>2</sub> O <sub>5</sub> 0.7 K <sub>2</sub> O 3.7	5-1 (76)	5328	658	N 25.7 P <sub>2</sub> O <sub>5</sub> 5.5 K <sub>2</sub> O 33.1
Plant Tubers Total	5-18 (88)	8599 10875 10474	1224 1769 2093	N 48.0 P <sub>2</sub> O <sub>5</sub> 5.6 K <sub>2</sub> O 40.9	5-16 (91)	10360 21159 31528	1554 3851 5495	N 45.1 P <sub>2</sub> O <sub>5</sub> 4.8 K <sub>2</sub> O 81.2
Plant Tubers Total	6-1 (102)	9695 18546 28241	1701 3522 5223	N 45.4 P <sub>2</sub> O <sub>5</sub> 11.3 K <sub>2</sub> O 82.7	6-1 (107)	7014 25459 32473	1220 5410 6639	N 31.0 P <sub>2</sub> O <sub>5</sub> 3.1 K <sub>2</sub> O 57.1
Plant Tubers Total	6-18 (110)	10116 23900 34016	1576 5000 7185	N 37.7 P <sub>2</sub> O <sub>5</sub> 4.5 K <sub>2</sub> O 59.4	6-11 (117)	7182 31646 38828	1290 6889 8188	N 30.6 P <sub>2</sub> O <sub>5</sub> 3.8 K <sub>2</sub> O 50.4
Plant Tubers Total				N 63.4 P <sub>2</sub> O <sub>5</sub> 18.0 K <sub>2</sub> O 130.4				N 73.0 P <sub>2</sub> O <sub>5</sub> 18.1 K <sub>2</sub> O 149.4
Plant Tubers Total				N 101.1 P <sub>2</sub> O <sub>5</sub> 22.5 K <sub>2</sub> O 189.8	6-18 (124)	3355 31400 34755	1015 7049 8064	N 103.6 P <sub>2</sub> O <sub>5</sub> 20.9 K <sub>2</sub> O 199.8
Plant Tubers Total								N 21.3 P <sub>2</sub> O <sub>5</sub> 3.5 K <sub>2</sub> O 40.8
Plant Tubers Total								N 67.0 P <sub>2</sub> O <sub>5</sub> 21.8 K <sub>2</sub> O 153.7
Plant Tubers Total								N 88.3 P <sub>2</sub> O <sub>5</sub> 25.3 K <sub>2</sub> O 194.5

\*Figures in parenthesis refer to number of days after planting.

TABLE 6.—Effect of fertilizer treatment and time of sampling on growth and nutrient absorption by an acre of potatoes. Fertilized with 100-0-0 pounds per acre of N, P<sub>2</sub>O<sub>5</sub>, and K<sub>2</sub>O, respectively.

Portion Sampled	1945 Crop						1946 Crop					
	Growth—Pounds per Acre			Nutrients Absorbed Pounds per Acre			Growth—Pounds per Acre			Nutrients Absorbed Pounds per Acre		
	Date of Sampling	Fresh Weight	Dry Weight	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	Date of Sampling	Fresh Weight	Dry Weight	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O
Plant Tubers Total	4-20 (60)*	1113	98	6.2	1.1	6.5	4-20 (65)*	3305	382	22.6	3.8	23.1
		—	—	—	—	—		944	121	3.1	1.0	3.5
		1113	98	6.2	1.1	6.5		4249	503	25.7	4.8	26.6
Plant Tubers Total	5-3 (73)	6086	674	40.0	2.3	44.6	5-1 (76)	8936	1020	49.4	6.9	65.9
		1366	150	4.0	1.0	5.5		8599	1112	19.4	5.8	32.5
		7452	824	44.0	3.3	50.1		17535	2132	68.8	12.7	68.4
Plant Tubers Total	5-18 (88)	10622	1301	55.0	6.1	76.2	5-16 (91)	9442	1444	46.9	4.0	70.2
		9863	1512	24.3	5.1	40.1		18968	3475	42.4	9.2	82.0
		20485	2873	79.3	11.2	116.3		28410	4919	89.3	13.2	152.2
Plant Tubers Total	6-1 (102)	11206	1762	51.8	4.6	67.5	6-1 (107)	9138	1377	38.3	3.6	64.1
		22087	4145	51.0	17.4	98.4		31124	6617	76.1	15.2	145.0
		33383	5907	102.8	22.0	165.9		40262	7994	114.4	18.8	209.1
Plant Tubers Total	6-18 (119)	12645	1992	52.3	7.2	60.6	6-11 (117)	9695	1608	37.6	3.8	63.7
		26100	5001	80.5	18.2	128.0		32405	7262	78.4	16.1	140.0
		38745	7893	132.8	25.4	197.6		42100	8870	116.0	19.9	203.7
Plant Tubers Total							6-18 (124)	4013	1267	22.9	2.6	40.1
								37500	8040	98.3	22.1	192.7
								41513	10207	121.2	24.7	232.8

\*Figures in parenthesis refer to number of days after planting.

TABLE 7.—Effect of fertilizer treatment and time of sampling on growth and nutrient absorption by an acre of potatoes. Fertilized with 100-125-125 pounds per acre of N, P<sub>2</sub>O<sub>5</sub>, and K<sub>2</sub>O, respectively.

Portion Sampled	1945 Crop					1946 Crop						
	Date of Sampling	Growth—Pounds per Acre		Nutrients Absorbed Pounds per Acre			Date of Sampling	Growth—Pounds per Acre		Nutrients Absorbed Pounds per Acre		
		Fresh Weight	Weight Dry	N	P2O5	K2O		Fresh Weight	Dry Weight	N	P2O5	K2O
Plant Tubers Total	4-20 (60)*	1467	128	8.0	2.1	8.8	4-20 (65)*	2900	346	21.9	5.4	19.5
		—	—	—	—	—		776	96	2.8	0.9	3.0
		1467	128	8.0	2.1	8.8		3676	442	24.7	6.3	22.5
Plant Tubers Total	5-3 (73)	7435	800	45.1	4.2	52.7	5-1 (76)	10200	1076	52.6	11.0	70.1
		1669	176	4.3	1.9	6.4		7503	947	16.9	7.3	27.5
		9104	976	49.4	6.1	59.1		17703	2023	69.5	18.3	97.6
Plant Tubers Total	5-18 (88)	13151	1623	65.4	10.8	81.3	5-16 (91)	12982	1936	58.1	7.1	91.7
		11971	1969	28.6	10.5	51.2		23267	4223	54.9	16.8	98.2
		25122	3592	94.0	21.3	132.5		36249	6159	113.0	23.9	189.9
Plant Tubers Total	6-1 (102)	15511	2517	66.0	8.4	90.4	6-1 (107)	14651	2129	56.2	6.3	103.1
		22677	4245	51.4	16.5	100.7		40886	8521	99.7	27.7	210.4
		38188	6762	117.4	24.9	191.1		55537	10650	155.9	34.0	313.5
Plant Tubers Total	6-18 (119)	15596	2375	56.5	8.9	82.4	6-11 (117)	11144	1728	38.4	4.4	57.2
		31400	7238	91.9	24.9	162.2		42268	9806	103.0	28.7	177.2
		46996	9613	148.4	33.8	244.6		53412	11534	141.4	33.1	234.4
Plant Tubers Total	6-18 (124)	7216	1913	33.1	4.8	57.1	6-18 (124)	7216	1913	33.1	4.8	57.1
		39500	9614	105.8	31.3	195.7		39500	9614	105.8	31.3	195.7
		46716	11527	138.9	36.1	252.8		46716	11527	138.9	36.1	252.8

\*Figures in parenthesis refer to number of days after planting.

counts for most of the decrease in nitrogen, phosphoric acid, and potash per unit of the dry weight.

Data on the effect of fertilizer treatment and time of sampling on growth and total nutrient absorption are presented in tables 4 to 7, inclusive. In 1945 plants grown on plots without nitrogen made no tuber growth and very little plant growth until 60 days after planting. Plant growth was most rapid between 60 and 102 days whereas tuber growth was practically *nil* until 73 days after planting and then continued fairly uniformly until harvest in 119 days. In 1946 both plants and tubers had practically ceased growth 117 days after planting, however the grand periods of growth were similar to those of the previous year.

The amounts of nutrients absorbed were closely related to growth. At harvest in 1945 an unfertilized crop yielding 131 sacks per acre had absorbed 59 pounds of nitrogen, 17 of phosphoric acid, and 126 of potash per acre. The tubers alone accounted for 33 pounds of nitrogen per acre, 14 of phosphoric acid, and 79 of potash. Approximately one-half of the nutrients were absorbed during the last 30 days of growth. In 1946 the crop which yielded 165 sacks contained 64 pounds of nitrogen, 14 of phosphoric acid and 138 of potash of which the tubers contained 43 of nitrogen, 11 of phosphoric acid, and 100 of potash. About one-half of the nutrients was absorbed after 91 days of growth but in a three-week period immediately following.

Nitrogen applications very greatly increased growth and the amount of nutrients absorbed. At harvest in 1945 potatoes fertilized with 100 pounds of nitrogen per acre and producing 261 sacks had absorbed 133 pounds of nitrogen, 25 of phosphoric acid, and 198 of potash. In 1946 comparable figures for a yield of 375 sacks were 121 pounds of nitrogen, 25 of phosphoric acid, and 233 of potash. The tubers alone in 1945 had removed 81 pounds of nitrogen per acre, 18 of phosphoric acid, and 128 of potash, whereas in 1946 the absorption was 98 pounds of nitrogen, 22 of phosphoric acid and 193 of potash. The most rapid rate of nutrient absorption, particularly by the tubers, occurred between 70 and about 110 days after planting. The nutrient absorption by plants fertilized with 50 pounds of nitrogen was approximately midway between those receiving none and 100 pounds of nitrogen per acre.

The nutrient absorption and growth were highest from the complete fertilizer treatment. The absorption of phosphorus was materially increased by phosphorus fertilization. This was due not only to the slightly greater growth but also to a higher phosphorus content of the plants and tubers. At harvest in 1945 a 314 sack crop contained 148

pounds of nitrogen per acre, 34 of phosphoric acid, and 245 of potash. Of this amount the tubers contained about two-thirds of the nitrogen and potash and about three-fourths of the phosphoric acid. In 1946 a crop which produced 395 sacks per acre contained 139 pounds per acre of nitrogen, 36 of phosphoric acid, and 253 of potash. The tubers alone accounted for 106 pounds of nitrogen, 31 of phosphoric acid, and 196 of potash.

### DISCUSSION

The results presented in this paper agree fairly well with those reported earlier and show that the greatest amount of growth and the greatest intensity of nutrient absorption occur between about 75 and 110 days after planting or 45 to 80 days after plant emergence. This is shown graphically for one treatment in Figure 1. This treatment was used for illustration since it is the one receiving the fertilizer treatment

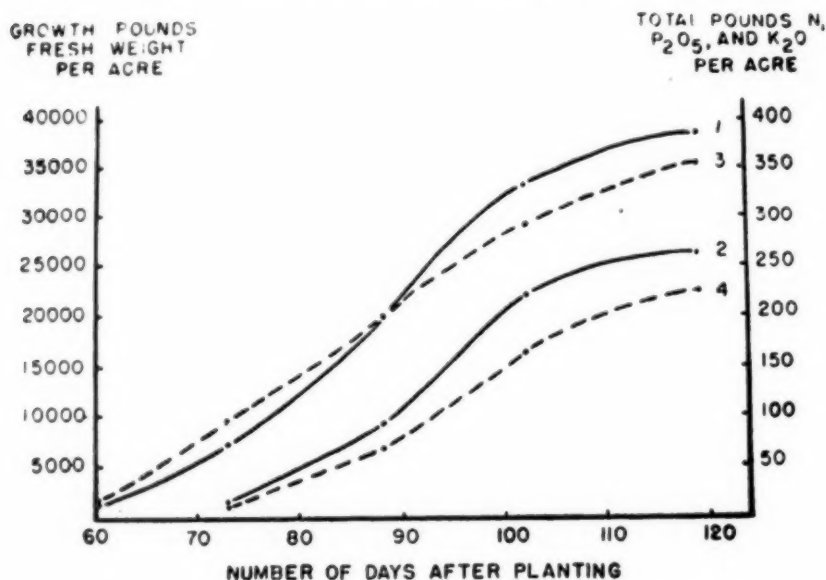


Fig. 1 Growth and nutrient absorption by an acre of potatoes, 1945 crop, fertilized with 100 pounds of nitrogen per acre. 1-Fresh weight of total plants. 2-Fresh weight of tubers. 3-Pounds of N, P<sub>2</sub>O<sub>5</sub>, and K<sub>2</sub>O absorbed by total plants. 4-Pounds of N, P<sub>2</sub>O<sub>5</sub>, and K<sub>2</sub>O absorbed by tubers.

used most commonly for potatoes grown in this area and also produced what is considered as a good average yield for the area.

The data gives certain information regarding the efficiency of the

nitrogen fertilizers applied. In 1945 plants which were unfertilized absorbed 59 pounds of nitrogen per acre as compared with 101 and 133 pounds for plants fertilized with 50 and 100 pounds of nitrogen per acre, respectively. Thus when 50 pounds of nitrogen were applied the recovery was 43 pounds and when 100 pounds were applied the recovery was 74 pounds. Adding phosphorus and potassium to the 100 pounds of nitrogen treatment resulted in the absorption of a total of 148 pounds of nitrogen or 89 pounds of that applied. In 1946 unfertilized plants removed 64 pounds of nitrogen. Those fertilized with 50 and 100 pounds of nitrogen removed 88 and 121 pounds per acre, respectively, or 24 and 57 pounds of the fertilizer originally applied. The complete fertilizer treatment removed 139 pounds of nitrogen or 75 pounds from the 100 pounds originally applied. In all treatments where only nitrogen fertilizer was applied the tubers alone removed about one-half of the nitrogen supplied.

#### SUMMARY

Comparisons were made on growth and on dry matter, nitrogen, phosphoric acid, and potash content of the potatoes grown at four different fertilizer levels during 1945 and 1946.

Nitrogen content of plants and tubers was increased by nitrogen fertilization during the early stages of growth but this was not true at maturity.

Nitrogen, phosphoric acid, and potash greatly decreased per unit of dry weight in both plants and tubers as they approached maturity.

The greatest amount of growth and the greatest intensity of nutrient absorption occurred between about 75 and 110 days after planting or between 45 and 80 days after emergence.

An unfertilized crop of potatoes grown in 1945 and producing 119 sacks contained 59 pounds of nitrogen per acre, 17 of phosphoric acid, and 126 of potash. The tubers alone removed 33 pounds of nitrogen, 14 of phosphoric acid and 79 of potash. The highest yielding treatment which in 1946 produced 395 sacks per acre, absorbed 139 pounds of nitrogen, 36 of phosphoric acid and 253 of potash. The tubers alone removed 106 pounds of nitrogen, 31 of phosphoric acid, and 196 of potash.

#### LITERATURE CITED

1. Lorenz, O. A. 1944. Studies on potato nutrition: II. Nutrient uptake at various stages of growth by Kern County potatoes. *Proc. Amer. Soc. Hort. Sci.* 44: 389-394.
2. ——— 1944. Studies on potato nutrition I. The effects of fertilizer treatment on the yield and composition of Kern County potatoes. *Amer. Potato Jour.* 21: 179-192.

## INHERITANCE OF PREDISPOSITION OF POTATO VARIETIES TO INTERNAL MAHOGANY BROWNING OF THE TUBERS

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It has been shown that "internal mahogany browning" of the potato tubers of certain varieties is induced by continuous storage for several months at about 32° F., that leafroll increases the predisposition of a variety to the development of this injury, and that in addition to the culinary damage the injury in seed potatoes may reduce the stand and yield rate (4). Green Mountains were much less predisposed to this effect than were Chippewas and Katahdins. It has since been noticed that new seedling varieties may vary considerably in predisposition, within the same cross and as between seedlings in one cross and seedlings in another.

The data presented here were obtained in the routine testing, for predisposition to mahogany browning, of seedling varieties found to be resistant to the natural spread of leafroll (3). One series of samples from the 1943 crop of certain seedling varieties was stored at 32° F. for several months in an experimental potato storage and another series from the 1946 crop of other seedling varieties was stored at about 31° F. for six months in a commercial apple storage. The tubers were examined at the end of the period of storage. Most of the injury in the 1943 series was typical (reddish brown). The injury in the 1946 series was more severe in certain varieties used in both tests, and was more diverse in character. In some seedlings, yellowing and slate color developed, apparently as milder phases, instead of the typical browning, or along with it, whereas in others the brown tissues had become almost black and approached a "leaker" stage. Cracks developed in the darker brown tissue and sometimes even in typical brown tissue. (See Fig. 1). The results are given in tables 1 and 2. Other samples from the same seedlings of the 1946 series were kept in an experimental potato storage at 36° F. and remained free from all injury.

The results in table 1 show that X750-10 and Chippewa are more predisposed to mahogany browning than X1276-48, X1276-185, X247-48, or Green Mountain. The results in table 2 show that under more severe conditions X1276-185 joins Chippewa, and Green Mountain more nearly approaches Chippewa, in predisposition, whereas Katahdin is more pre-

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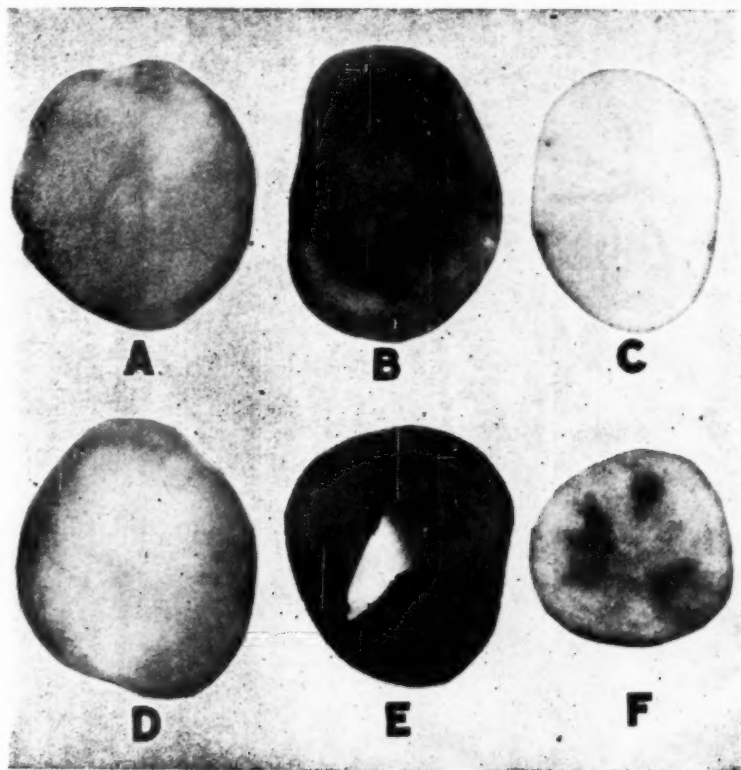


FIG. 1. Tuber slices with internal mahogany browning from six months storage at about 31° F. A, Chippewa with the usual reddish brown injury; B, seedling variety B298-89 with small cracks in blackened tissue; C, seedling variety B298-16 with no injury; D, seedling variety B244-124 with cortical browning; E, seedling variety B410-59 with large central crack in blackened tissue; F, seedling variety B514-14 with radial cracks in brown islands of tissue. Note that B and C are seedlings of the same cross.

disposed than Chippewa. The much greater difference in predisposition between X750-10 and X1276-48 (Table I) is reflected in the crosses B410 and B420 (Table 2), in which these two seedling varieties were respectively crossed with X247-48. In Cross B410 the percentage of affected tuber flesh was much higher and the predominant or average type of injury was more severe, probably as the result of the use of the more predisposed X750-10 as a parent. In the several crosses between X247-48 and commercial varieties, generally less predisposition was transmitted to the seedlings than in cross B410. In several crosses the extent of injury varied from none to 72-100 per cent as between seedlings.

TABLE 1.—*Comparison of various commercial and seedling varieties as to predisposition to internal mahogany browning, 1943 crop.*

Cross	Components of Cross	Variety	Injury	
			Kind	Prevalence (Per Cent of Tubers Affected) <sup>1</sup>
X750	Imperia x Katahdin	X750-10	Severe	100
X1276	Houma x Katahdin	X1276-48	Slight	40
X247	Kepplestone Kidney x Earlane	X1276-185	Slight just below skin	100
		X247-24	Severe	100
		X247-30	Slight gray	20
		X247-42	Severe	60
		X247-48	Typical	60
B24	Imperia x Earlane	B24-9	Severe	100
		B24-16	Severe	100
		B24-19	Typical	80
		B24-50	Slight	40
		B24-58	Slight gray	20
		B24-76	Severe	60
			Slight	40
		B24-78	Very slight	20
		B24-91	Slight	60
		B24-156	Typical	60
		B24-174	Typical	40
		B24-190	Typical	40
		B24-238	Typical	100
		B24-304	Typical	40
			Vascular	60
	40568 x 24642 <sup>2</sup>	Chippewa	Severe	100
	Dunmore x Excelsior <sup>2</sup>	Green Mountain	Slight gray	10

<sup>1</sup>20 tubers of Chippewa and of Green Mountain, and 5 of each other variety, were kept at 32° F. for several months.

<sup>2</sup>See 1 and 2 of Literature Cited.

### DISCUSSION

Mahogany browning is still an important cause of loss in certain commercial varieties in a northern potato region such as Aroostook County, Maine. The need to regulate storage temperature is an extra bother even if regulation is effective for control. Predisposition to this form of injury should be tested in new seedling varieties considered for northern areas. Apparently the proper selection of the parents for crosses can be helpful in developing varieties resistant to this defect.

### CONCLUSION

Predisposition to mahogany browning varies from one commercial

TABLE 2.—*Comparison of various commercial and seedling varieties as to predisposition to internal mahogany browning, 1946 crop.*

Cross	Components of Cross	Variety	Injury		
			Kinds <sup>1</sup>	Percentage of Tuber Flesh Affected <sup>2</sup>	Severity <sup>3</sup>
X1276	Houma x Katahdin 40568 x 24642 <sup>4</sup> Ditto <sup>4</sup> Dunmore x Excel- sior <sup>4</sup>	X1276-185	B	82	B
		Chippewa	B	93	B
		Katahdin	BLC	97	BLC
		Green Moun- tain	B	55	B
B410	X750-10 x X247-48	B410-3	BL	86	BL
		B410-10	SBC	72	B
		B410-44	SBC	82	B
		B410-56	BLC	100	BLC
		B410-59	BC	68	BC
		B410-76	SBLC	82	BLC
		B410-81	SBC	48	SB
		B410-101	BC	80	B
		B410-105	BLC	74	BC
		B410-111	BLC	96	BC
B420	X1276-48 x X247-48	B420-30	O	0	O
		B420-55	O	0	O
		B420-72	SBC	36	B
		B420-73	Y	2	Y
		B420-78	O	0	O
		B420-82	B	8	B
		B420-106	Y	3	Y
		B420-129	SBC	8	B
		B420-134	SBC	32	B
		B420-151	O	0	O
		B420-154	B	62	B
		B420-173	SB	34	B
		B420-174	SBC	28	B
		B420-175	BC	14	B
		B420-178	O	0	O
		B420-181	BLC	72	B
		B420-182	BL	37	B
		B420-185	B	30	B
		B420-186	B	4	B
		B420-206	S	12	S
		B420-208	BC	46	B
		B420-215	YSB	10	SB
B289	X247-48 x Katah- din	B289-30	BL	36	B
		B289-151	BC	13	B
B285	X247-48 x Green Mountain	B285-139	B	3	B
		B285-208	YB	24	B
		B285-216	B	17	B
		B285-219	B	36	B
B298	X247-48 x Houma	B298-16	O	0	O
		B298-17	O	0	O
		B298-21	O	0	O

Cross	Components of Cross	Variety	Injury		
			Kinds <sup>1</sup>	Percentage of Tuber Flesh Affected <sup>2</sup>	Severity <sup>3</sup>
B308 B314	X247-48 x Sebago X247-48 x Sequoia	B298-60	B	30	B
		B298-78	B	47	B
		B298-79	O	0	O
		B298-80	BLCBI	100	BLC
		B298-82	B	43	B
		B298-83	O	0	O
		B298-88	O	0	O
		B298-89	BC	90	BC
		B298-94	YBC	30	YB
		B308-68	B	17	B
		B314-3	SBC	76	BC
		B314-6	B	6	B
		B314-25	B	10	B
		B314-48	B	28	B
		B314-49	B	2	B
		B314-66	B	3	B

<sup>1</sup>Y=yellowing; S=slate-color in flesh; B=browning; L="leaker" effect somewhat like that of severe freezing, but with dark color developed before tuber is cut; C=cracking where flesh is dark; Bl=blackening or very dark browning; O=no injury.

<sup>2</sup>Based on individual estimates for 5 tubers in each seedling variety and 10 tubers in each commercial variety.

<sup>3</sup>Predominant or average kind of injury, increasingly more severe with yellowing, slate-color, browning, blackening, leaker effect, and cracking.

<sup>4</sup>See 1 and 2 of "Literature Cited."

or seedling variety to another, the relative amount of injury as between varieties may change with the temperature of storage, and predisposition is inherited.

#### LITERATURE CITED

1. Clark, C. F., and P. M. Lombard. 1946. Descriptions of and key to American potato varieties. U. S. Dept. Agr. Circ. 741.
2. Folsom, Donald. 1945. Potato varieties: the newly named, the commercial, and some that are useful in breeding. *The Amer. Potato Jour.* 22:229-242.
3. ——— and F. J. Stevenson. 1946. Resistance of potato seedling varieties to the natural spread of leafroll. *The Amer. Potato Jour.* 23:247-264.
4. Hilborn, M. T., and Reiner Bonde. 1942. A new form of low-temperature injury in potatoes. *The Amer. Potato Jour.* 19:24-29.

## RECENT SPRAY TESTS FOR CONTROL OF POTATO LATE BLIGHT IN SUB-TROPICAL FLORIDA

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The potato growing section located in South Dade County near Homestead, Florida, is a comparatively new potato producing area. Between 6,000 and 7,000 acres are grown in mid-winter, practically all of the seed being planted during November and the crop harvested in February and March. Bliss Triumph and Pontiac are the leading varieties.

Several factors tend to make the control of foliage diseases difficult in this area. The potatoes are grown during the short days of winter rather than the long days of the northern summer growing season. Although rains are infrequent during the winter months, dew formation is usually very heavy, often beginning by 5:00 P. M. with the plants remaining wet until 10:00 A. M. or later the following day. Growth of the tops usually is rapid and rank. These conditions are very favorable for rapid development of plant diseases, particularly the downy mildews. More or less foliage injury commonly occurs following repeated applications of fungicides, especially bordeaux mixture and copper-lime dust.

Early blight was the only foliage disease of importance until 1935 when late blight appeared. Since 1938, late blight has been the most important foliage disease, although if *Sclerotinia sclerotiorum* (Lib.) DeBy.) continues to increase in severity, it may soon replace late blight as the most serious foliage trouble. The terms early blight and late blight are misnomers when applied to the diseases caused by *Alternaria solani* (E. & M.) J. & G. and *Phytophthora infestans* (Mont.) DeBy., respectively, as they occur in the Homestead section. Early blight is usually of little importance until late in the season as the plants approach maturity, whereas late blight may occur at any time after the plants appear above ground.

The potato flea beetle has not appeared in the area and leafhoppers are of no consequence on potatoes. Aphids are primary factors in reducing yields in some seasons. Cucumber beetles, army worms, and plant bugs are occasionally troublesome and in some years a serpentine leaf miner may cause considerable damage.

Field experiments for control of foliage blights of potato have been conducted annually since 1935. In the first three seasons, when late blight was a minor disease at the Station farm, it was unprofitable to spray or dust with copper fungicides for blight control. Various formulations of bordeaux mixture or copper-lime dust either reduced the yield

or did not increase it significantly. The use of various neutral copper sprays or dusts either had no effect on the yield or increased it insufficiently to be profitable. From the 1938-1939 season, when late blight first became of major importance, until the 1943-1944 season, all copper sprays or dusts used experimentally generally gave significant and profitable increases in yield. Wet sprays were more effective than dust treatments for blight control (2). The addition of zinc sulfate and hydrated lime to copper sprays reduced spray injury from these fungicides and in some seasons significant increases in yield resulted from the addition of the zinc salt. When used with insoluble neutral coppers, the zinc salt causes flocculation of the suspended copper particles, decreases run-off and increases the initial deposit of copper on the foliage.

During the 1943-1944 season, the weather was moist and cool from the middle of November through December, and late blight was widespread and destructive by the 25th of December. In many fields it was well established on the foliage of the earliest plants to emerge before all of the sprouts had appeared above ground. Under these conditions, control of the disease was unsatisfactory with copper sprays or dusts. Some growers failed adequately to check the disease although they sprayed twice a week, making a total of 14 to 16 applications during the growing season. The average yield in commercial fields probably did not exceed 125 bushels per acre for the section as a whole, which was little more than half the average obtained during normal seasons. Under these severe late blight conditions, Dithane combined with zinc sulfate or zinc sulfate and lime gave such outstanding control in test plots as compared with copper fungicides that growers in the area adopted the new treatment almost without exception.

The experiments with Dithane in comparison with other fungicides during the past three seasons, which produced results of particular interest, are discussed in this paper. Additional tests made for the purpose of screening out undesirable materials or combinations are not included herein.

The general procedure was as follows. All experiments were made on Bliss Triumph potatoes planted about the middle of November and harvested in March after the foliage was dead. Individual plots were 75 feet long and 4 rows wide, or approximately 1/46 of an acre and were planted with a single-row assisted-feed-type planter. The treatments were randomized and were replicated from 3 to 6 times in the various tests. The materials were applied with a tractor drawn power sprayer of standard make developing 400 pounds pressure which was equipped with a 4-row spray boom. The various treatments were applied on the

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same day and were begun when the plants were 6 to 8 inches tall. They were repeated once a week or every 6 to 8 days for a total of 6 or 7 applications. Approximately 150 gallons per acre were applied from 3 nozzles to the row in the first two applications; 200 gallons per acre were applied from 4 nozzles to the row in the next 4 applications and slightly more than 200 gallons per acre were applied from 5 nozzles per row in the last application. In addition, some exploratory tests were made in single-row plots planted by hand and the materials applied with a knapsack sprayer.

#### PRESENTATION OF DATA

Table 1 summarizes the yield data from an exploratory test\* on single-row plots 22 feet long, the treatments being replicated 3 times and applied 9 times, each with a knapsack sprayer during the 1943-1944 season.

TABLE 1.—*Results of spray test on potatoes with Dithane used alone and in combination with ZnSO<sub>4</sub> or ZnSO<sub>4</sub>-lime, Homestead, Florida, 1943-1944.*

Materials	Formulas Pounds in 100 Gals. Water	Bushels per Acre	Percentage of Yield in U. S. No. 1 Tubers
Untreated — Check		93.8	54.3
Dithane	2	163.7	76.7
Dithane	4	186.5	78.9
Dithane + ZnSO <sub>4</sub>	2-1	353.4	92.7
Dithane + ZnSO <sub>4</sub>	4-1	311.4	87.5
Dithane + ZnSO <sub>4</sub> -lime	2-1-½	325.4	90.8
Dithane + ZnSO <sub>4</sub> -lime	4-1-½	381.4	93.4

The data showed that the addition of zinc sulfate greatly increases the effectiveness of Dithane for control of potato late blight, as reported in 1944 (3). Some foliage injury appeared late in the season in the plots sprayed with Dithane-zinc sulfate without the addition of lime. This was attributed to zinc toxicity.

Table 2 presents the data on the percentage of foliage killed by late blight 70 days after planting and the yields obtained from the treatments in the machine-sprayed experiment conducted in 1943-1944. As originally planned, the experiment included 13 treatments replicated 6 times each, but the development of seed-piece decay following several days of rain immediately after planting forced the abandonment of the plots.

\*Conducted cooperatively with the late Dr. L. L. Hill of the Röhm & Haas Company.

New plots were planted to include 3 replications of 7 treatments. Late blight was present in a mild form in all the test plots at the time of the first spray application.

TABLE 2.—*Results of spray test on potatoes with Dithane-ZnSO<sub>4</sub>-lime, Phygon, and copper fungicides, Homestead, Florida, 1943-1944.*

Fungicides	Formulas	Percentage of Foliage Killed by Late Blight, 70 Days after Planting	Bushels per Acre	
	Pounds in 100 Gals. Water		Total Marketable	Increase over Check
Untreated — Check		78	48	
Dithane—ZnSO <sub>4</sub> -lime	1 ½-1-½	6	304	256
Cuprocide—ZnSO <sub>4</sub> -lime	1 ½-1-½	19	203	155
Cuprocide—CuSO <sub>4</sub> -lime	1-1-½	21	180	132
Copper-Hydro 40	8	27	188	140
Copper-Hydro 40-ZnSO <sub>4</sub> -lime	8-2-1	32	135	87
Phygon	1	2	156	108

Dithane plus zinc sulfate-lime was the outstanding fungicide in the test. Although Phygon gave slightly better control of late blight, it was toxic to the plants and the yields were low. Bordeaux mixture was not included in this experiment but yields in commercial fields sprayed with this fungicide in the vicinity of the Station farm ranged from 100 to 200 bushels per acre in the 1943-1944 season and control of potato late blight was no better than in fields sprayed with Cuprocide or Copper-Hydro. Control of early blight was better with Dithane plus zinc sulfate-lime than with the copper sprays, confirming the results reported by Heuberger and Manns (1) in Delaware.

In the 1944-1945 season approximately 95 per cent of the potato acreage was sprayed with Dithane-zinc sulfate-lime and potato yields were the highest on record for the section, averaging approximately 350 bushels per acre. Late blight was first observed on the 5th of January in a field where the potatoes had been sprayed 4 times with one of the insoluble copper sprays. A few days later it was found in several widely scattered fields where the plants were either sprayed or dusted with copper fungicides, were imperfectly sprayed with Dithane, or were unsprayed. Despite the cool weather, accompanied by considerable fogginess and several showers during January and part of February, late blight made surprisingly little headway and caused only negligible damage in fields sprayed thoroughly once a week with Dithane-zinc sulfate-lime. The growing life of the plants was extended several weeks and

growers with large acreages found it necessary to kill the tops with herbicides in order to begin harvesting operations on time. The new spray evidently prevented late blight from becoming epidemic and controlled early blight exceptionally well.

In the two machine-sprayed field experiments carried out on the Station farm, late blight appeared too late in the season to affect the yields seriously even on the untreated plots. The first test was conducted cooperatively with Dr. R. A. Hyre of Ohio State University. Treatments were replicated 4 times each and a total of 7 applications were made during the season. The results are summarized in table 3.

TABLE 3.—*Results of spray test on potatoes in test 1, Homestead, Florida, 1944-1945 (4 replications, each treatment).*

Fungicides	Formulas	Percentage of Foliage Killed by Blight 90 Days after Planting	Bushels per Acre	
	Pounds in 100 Gals. Water		Total Marketable	Increase over Check
Untreated - Check		100	329	
Dithane-ZnSO <sub>4</sub> -lime	1.5-1-0.5	37	455	126
Na dimethyl dithiocarbamate-ZnSO <sub>4</sub> -lime	1.5-1-0.5	65	437	108
Methasan	1.5	87	415	86
Basi-Cop-ZnSO <sub>4</sub> -lime	4-1-0.5	84	407	78
Methasan-ZnSO <sub>4</sub> -lime	1.5-1-0.5	80	401	72
Bordeaux mixture	8-6	53	376	47
Basi-Cop-lime	4-8	96	376	47

Difference required for significance with odds 19:1=25.8 bushels.

Difference required for significance with odds 99:1=35.1 bushels.

All treatments significantly outyielded the unsprayed checks, and the Dithane-zinc sulfate-lime treatment significantly outyielded all treatments with the exception of the sodium dimethyl dithiocarbamate. However, at 90 days from planting date, late blight was more prevalent in the plots sprayed with the sodium salt than with Dithane, indicating that the difference in yield in favor of the Dithane-zinc sulfate-lime treatment probably would have been greater if late blight had appeared earlier in the season.

The results obtained in test 2 are summarized in table 4. In this test, treatments were replicated 6 times each and a total of 6 applications were made during the season.

TABLE 4.—Results of spray test on potatoes in test 2, Homestead, Florida, 1944-1945 (6 replications, each treatment).

Fungicides	Formulas	Estimated Per cent Foliage Killed by Blight 90 Days after Planting		Yield in Bushels per Acre	
		Late Blight	Early Blight	Total Marketable	Increase over Check
Untreated-Check		70	27	297	
Dithane+ZnSO <sub>4</sub> -lime	1.5-1-0.5	—1	1	384	87
AO-3	3	1	2	377	80
Copper Compound A	4	2.5	13	372	75
Zinc chromate #169	4	5	8	370	73
Copper Compound A-ZnSO <sub>4</sub> -lime	4-1-0.5	2.5	5	367	70
Zerlate	2	15	1	361	64
Dithane-Delmo-Z*	1.5-1	—1	1	355	58
A-O 3 + Phygon	2.5-0.5	—1	2	355	58
Copper-Hydro 40	6	3	20	351	54
Tribasic copper sulfate	4	2	25	346	49
Bordeaux mixture	8-6	2.5	3	345	48
Zinc chromate #298	4	2.5	3	313	16

Difference required for significance with odds 19:1=20.6 bushels.

Difference required for significance with odds 99:1=42.2 bushels.

\*Neutralized zinc.

All treatments with the exception of the zinc chromate No. 298 increased the yield significantly compared with the untreated checks. Dithane-zinc sulfate-lime gave the highest yield, which, however, was not significantly higher than the yields following AO-3, Copper Compound A, Zinc chromate No. 169 and Zerlate treatments. The substitution of Delmo-Z, a neutralized zinc compound, for zinc sulfate and lime for use with Dithane does not appear desirable for conditions in southern Florida. An injury to the foliage followed the use of Dithane-Delmo-Z which apparently favored *Sclerotinia* infection and a reduction in yield resulted.

Flooding by salt water during the 15th of September hurricane left heavy deposits of chlorides in the soil of the Station farm and the test plots were located during the 1945-1946 season on rented lands with shallower and drier soil. The growing season was one of the driest on record and on the shallow marls yields were cut drastically by drought.

Dithane-zinc sulfate-lime was used on practically all of the commercial acreage and despite the fact that late blight was epidemic on nearby tomatoes, a crop which is grown extensively in the Homestead

section, little disease developed on potatoes sprayed thoroughly and systematically with the Dithane-zinc spray. Zerlate was used by a few growers but the results were not good with this material. Yields were low in some fields because of the presence of heavy chloride deposits and were high only in fields where the soil was deep, moist, free from dangerous amounts of salt and where the Dithane-zinc spray was used.

Only a single test was made with various fungicides, some of which were combined with DDT, for control of foliage blights and insects of potatoes. Sixteen treatments were included and were replicated 4 times each and repeated once a week for a total of 7 applications.

Late blight was observed in the control plots during the first week of January, and 80 days after planting had killed the foliage in these plots. It caused considerable damage in those sprayed with Zerlate and Dithiocarbamate IN-5445 but only minor damage in other plots and least damage in plots sprayed with Dithane-zinc sulfate-lime, Dithane-zinc sulfate Reaction Product and Dithiocarbamate IN-5446. The latter was received as a zinc-dithiocarbamate and was very similar in physical properties to the Dithane-zinc sulfate Reaction Product. Early blight was present in all plots but killed practically no foliage except in the plots sprayed with copper fungicides and then only late in the season as the tops approached maturity. *Sclerotinia sclerotiorum* caused damage in all plots, but more in those sprayed with the dithiocarbamates than in those sprayed with copper fungicides, although none of the treatments gave commercial control of this disease.

A serpentine leaf miner was prevalent and infestation was heaviest in plots sprayed with the dithiocarbamates. Aphids (mostly *Myzus persicae*) caused some damage and reduction of yields late in the growing season. The addition of  $\frac{1}{8}$  per cent DDT to Dithane-zinc sulfate-lime, Zerlate, Compound A, and Tribasic copper sulfate at each application gave almost complete control of these pests.

The yields and disease readings are summarized in table 5.

With the exception of the zinc chromate treatment, which caused a severe burning of the foliage, all treatments increased the yield, although in the case of Zerlate, Bordeaux mixture made with high calcium lime, Tribasic copper sulfate plus zinc sulfate-lime and Copper Compound A, the increases were not significant. The addition of DDT at  $\frac{1}{8}$  per cent to all applications of Dithane-zinc sulfate-lime, Zerlate, and insoluble copper fungicides further increased the yields, which increase in the case of Tribasic copper sulfate was significant. It seems probable that the yields from all treatments would have been much

TABLE 5.—*Results of spray test on potatoes, Homestead, Florida, 1945-1946 season.*

Fungicides	Formulas	Estimated Per cent of Foliage Killed by Blights 80 Days after Planting	Yield—Bu. per Acre	
	Pounds in 100 Gals. Water		Total Marketable	Increase over Check
Untreated - Check		100	171	
Dithane*-ZnSO <sub>4</sub> -lime	1.5-1-0.5	25	207	36
Dithane*-ZnSO <sub>4</sub> -lime + DDT 1/8%	1.5-1-0.5	22	225	54
Dithiocarbamate IN 5445	2	53	207	36
Dithiocarbamate IN 5446	2	25	208	37
Dithane-ZnSO <sub>4</sub> Reaction Product	2	31	218	47
Zerlate	2	57	199	28
Zerlate + DDT 1/8%	2	50	205	34
Copper Compound A	4	34	199	28
Copper Compound A + DDT 1/8%	4	21	222	51
Tribasic copper-ZnSO <sub>4</sub> -lime	4-1-0.5	37	187	16
Tribasic copper-ZnSO <sub>4</sub> -lime + DDT 1/8%	4-1-0.5	32	218	47
Copper-Hydro 40	6	39	205	34
Bordeaux - calcic lime	8-6	34	184	13
Bordeaux - Magnesium lime	8-6	26	202	31
Zinc chromate #169	5	39	166	-5

Difference required for significance with odds 19:1=30.6 bushels.

Difference required for significance with odds 99:1=56.2 bushels.

\*In the 1945-1946 season liquid Dithane was used at 2 quarts—100 gals. or the equivalent of 1½ pounds of dry disodium ethylene bisdithiocarbamate.

higher if the severe drought had not occurred and differences between treatments and the control almost certainly would have been greater.

#### DISCUSSION AND CONCLUSIONS

Dithane-zinc sulfate-lime is the most reliable spray treatment for the control of potato late blight thus far tested in the subtropical Homestead section of Florida. It also controls early blight very effectively and if properly mixed and used at 7-day intervals causes no visible injury to potato foliage. Injury from the treatment may occur in Florida if lime is omitted, if neutralized zinc is substituted for zinc sulfate-lime or if the treatment is applied at intervals of 4 or 5 days. Injury resulting from too frequent applications is less severe, however, than injury following repeated applications of copper fungicides at intervals of 4 or 5 days.

When blight appears in epidemic form there is a tendency on the part of growers to hurry the spray job in order to cover the fields more frequently. This is almost always accomplished only at the sacrifice of effective coverage and the grower defeats his purpose by doing this. It has been our experience that when severe blight conditions prevail, better results will be obtained by adding more nozzles properly adjusted and driving the sprayer at a speed which will obtain maximum coverage.

Dithane-zinc sulfate-lime spray remains effective for 7 or 8 days on potato foliage, is an expensive treatment and is not very convenient to handle in the field. We are watching with considerable interest the performance of the Dithane-zinc sulfate reaction product and the very similar zinc ethylene bisdithiocarbamate which can be shipped in a dry form and do not require the addition of zinc sulfate to the spray mixture. There is also the interesting possibility that these new materials may prove effective when applied as dusts.

Dithane-zinc sulfate-lime in common with other dithiocarbamate sprays is wholly ineffective against Sclerotiniose and does not repel many of our important insects, although aphids appear to build up slower on potato foliage sprayed with them than with the copper sprays. Dithane-zinc sulfate-lime is compatible with DDT and the combination shows promise as an effective fungicide-insecticide.

Copper sprays or dusts still have a place in southern Florida. Much of the soil used for growing potatoes there is either deficient in copper or is so alkaline that copper is immobilized when applied to the soil as fertilizer. A single copper spray or dust will supply this essential element under these conditions and in most seasons may be applied before blight becomes a serious problem.

The perfect fungicide for blight control has not yet been found and tests are being continued this year in an effort to find one better than Dithane-zinc sulfate-lime.

#### LITERATURE CITED

1. Heuberger, J. W. and T. F. Manns. 1944. The use of zinc sulfate-lime as a supplementary material to improve the protective value of organic and insoluble copper fungicides against early blight of potatoes. Del. Agr. Exp. Sta. Pamphlet No. 10, January 1944.
2. Ruehle, G. D. 1941. Experiments for control of potato late blight in an epidemic year. Proc. Fla. State Hort. Soc. for 1941:106-108.
3. ———. 1944. A new organic fungicide for control of potato late blight in Florida. Fla. Agr. Exp. Sta. Press Bull. 598:1-4.

## SECTIONAL NOTES

## CALIFORNIA

The harvesting of the early spring-planted crop in Kern County has been completed with 47,039 acres, yielding a harvest of 12,437,972 sacks,—an average yield of 264 sacks per acre.

At the present time, harvesting of the late crop of approximately 2600 acres is getting well under way in the Tehachapi area, at an elevation of approximately 4000 feet. Harvesting in this area will be complete by the 15th of November.

There is a very small acreage of new potatoes as we classify them grown in the floor of the valley. These will be harvested in December and January, and then lugged and sold in local California markets. (Sept. 3.)—DAVID N. WRIGHT.

## NEBRASKA

Nebraska growers have faced a very erratic season, almost from the beginning. As reported before, severe rain storms and floods occurred during the months of May and June, seriously affecting many crops throughout the state.

The early crop in central and eastern Nebraska, usually planted in April, was seriously affected by the storms, and part of the crop was lost as a result. Secondary effects were packing of fields, with a subsequent poor quality resulting. One of the chief defects in the early crop was flea beetle damage, which usually is not troublesome. This may be accounted for by the inability of our growers to spray and dust at the proper time because of weather conditions.

Most of the early crop has been marketed at this writing, with a very few lots remaining to be cleaned up. Early shipments deteriorated because of immaturity and some rotting caused by sun scald, consequently arriving on the market in poor condition. A small percentage of the crop went to the Government at the beginning, but this was generally discontinued at the end of their shipping season.

During the latter part of June and July, western Nebraska was hit by severe hail storms. In general, these storms did not affect the potato crop, since the plants in most instances were just emerging, whereas others were quite small. Although the effect was not apparent on the plants, the soil conditions became very poor, because of the abundant rainfall, which caused excessive packing and washing. After the middle of July, the temperatures changed radically from the cool, with excessive moisture, to the reverse. Since that time, which is a period of nearly seven weeks, there has been no general rainfall in the dry land areas of

western Nebraska. At the same time the heat has been intense, causing the ground to be dried and baked, making conditions unfavorable for quality production. Since the average frost date in western Nebraska is the 25th of September, the date when rainfall could relieve the situation is rapidly growing short. There is always the danger of an early frost with rainfall after the first of September. Therefore, our expectations of quality and yield are very pessimistic on the dry land territories at this time.

On the irrigated farms, which cover much of western Nebraska, both pump and stream irrigation, the situation is much better. Because of the heat, the set and size of potatoes are small, although there is time to correct this before harvest. Barring an early frost, the quality and yield of the irrigated crop should be near the average.

There are very few future sales made on either the seed or the table crop from the late territories. Most growers and shippers are optimistic about the price situation, because of the poor prospects for yield, and the decreased acreage that was planted in the late main crop of Nebraska. (Sept. 9.)—MARX KOEHNKE.

#### NEW JERSEY

Approximately two-thirds of New Jersey's potato crop which is estimated at 13,260,000 bushels has been harvested. The yields have been very good in most sections of the state, the average yield for the state being estimated at 221 bushels per acre, an all-time high for the state.

Approximately 7,000 carloads of 300 sacks each have been purchased by the government under the Price Support Program. Nearly 4,000 carloads have been exported, mostly to Argentina, more than 1,200 carloads were converted into alcohol, 500 to cattle feed, and 476 cars placed in storage, and the balance has been converted into starch or used for dehydration or by institutions and the school lunch program. Unless some radical change is made in the distribution of our crop, the industry will be swamped when government purchases cease next year. We must develop a program that will eliminate a glutted market and the resulting ruinously low prices for our product. The sooner this is done the better it will be for the entire industry.

New Jersey growers have entered slightly more than 300 acres of potatoes for certification this year. Approximately one-half of this acreage is devoted to the Katahdin variety. The hot, dry weather during the greater part of August and September has resulted in a slow development and a low yield is anticipated unless adequate rains come soon. (Sept. 19.)—J. C. CAMPBELL.

## NEW YORK

The crop in up-state New York, generally speaking, looks good considering the adversities through which it has passed. A late wet spring caused many sections of our fields to be drowned out and in some instances many seed pieces were lost. Blight started earlier this year than we have ever seen it, but with careful spraying and dusting it has been held in check by the growers who really fought to control it. DDT along with copper has also given a good control of insects.

Cobblers are now being harvested and a good crop is being reported. The late crop is apparently setting well and we can expect a good crop under normal conditions. However, the wet spring resulted in the roots being pretty close to the surface and the hot, relatively dry weather of August did some damage to them.

Seed growers have good crops, generally speaking, with very low virus readings. Our program for foundation stock seems to be showing good results. Some disappointment is expressed in getting some of the blight immunes and other new varieties certified because of the strictness of our certification standard and the fact that some of these varieties carry a virus disease. However, the blight-immunes are making a good showing in respect to blight and certainly show every indication of being very vigorous and high yielding. Among these are the Placid, Virgil and Madison. Teton, although not blight-resistant is being given a good trial and apparently showing up well for itself in a great many fields by a good set and is proving to be earlier than was at first expected. Ontarios are being given a trial this year especially in our scabby sections because it is hoped that this variety being scab-resistant, will help solve the scab problem for many growers.

Very little government buying is anticipated after the crop can go into storage. As yet, little interest has been shown by the dealers in signing up with the government but there still remain two weeks for the sign-up. (Sept. 3.)—W. J. EVANS.

## NORTH DAKOTA

Crop conditions in the Red River Valley are good. Although the spring was very wet and backward, the season since then has been excellent and late plantings have pretty well made up for lost time. Some digging has started and there is a little talk that yields are not going to be up to expectations, but it seems certain that the yield will be above the 125-bushel average carried in the crop report. Many farmers are using defoliant in order to prevent oversize and hasten maturity. There is a lot of burning and several different kinds of chemical defoliants

being used. There are two new machines here that are being tested, both of which chew up the vines and drop them between the rows. This leaves a nice clean field for digging and harvesting. We'll know more about them shortly.

There is considerable talk in this area of a latent infection of mosaic that is hitting certified fields. The Certification Service of North Dakota and Minnesota is watching this like a hawk and field rejections will be considerably heavier than expected. The Seed Department of both states realizes that a reputation for good seed stock will be a more valuable asset in the future than it has been in the past, and they are determined that only the best shall pass. It is difficult to tell at this time what our seed production will amount to.

This area will operate under a marketing agreement this season. The Control Committee of the North Central Potato Marketing Agreement covering North Dakota, Minnesota, Michigan, and Wisconsin, has already requested an order to restrict the shipment of culls. This will go into effect immediately, and every one is in favor of very rigid enforcement. This order will govern the sale of potatoes intra-state as well as inter-state.

As a result of last year's rather extensive feeding demonstrations, conducted in this area by the Extension Services and this association, we feel that farmers will be much more willing to keep their culls at home. Last year's demonstrations showed potatoes having a real value when fed to any kind of livestock. The Experiment Stations at both the University of Minnesota and the North Dakota Agricultural College are planning some intensive experiments this winter on the value of potatoes as a livestock feed. These tests will cover both the feeding of raw and naturally dehydrated potatoes, which were dumped during the winter and allowed to freeze. The discovery that this can be done here will be of considerable importance to all western states and may prove to be the answer of the by-product use for surpluses and low grades. (Sept. 10.)—W. M. CASE.

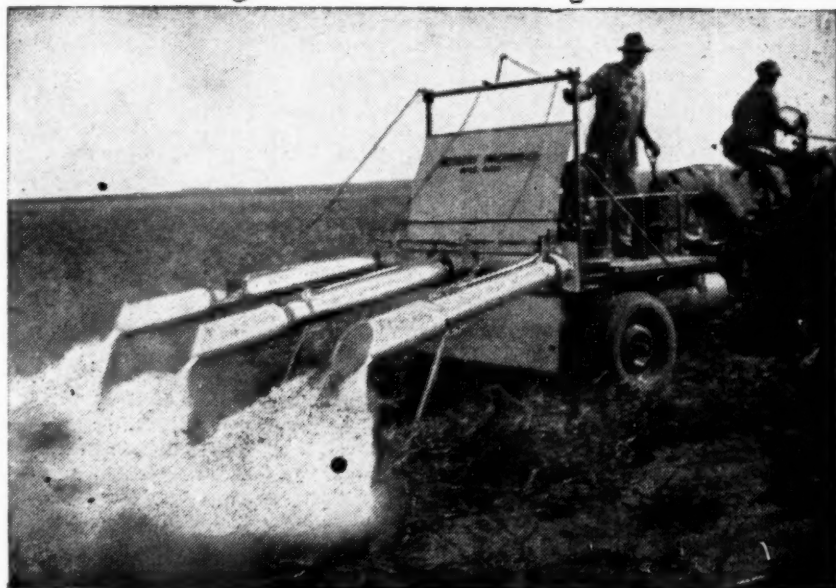
#### OREGON

There is considerable change in the potato crop situation here this year. The total acreage planted for the Klamath Basin is about two-thirds that of last year; this year's acreage being approximately 16,000. In addition, much planting was done early in May, on particularly dry soil during warm weather, resulting in considerable seed piece rot. This was followed by considerable wet weather causing development of rhizoctonia and this, in turn, was followed by heavy killing frosts the latter part of June. As a result we not only have a greatly reduced acreage but

stands are 15 to 20 per cent below normal and the crop is late. The consensus of grower and dealer opinion here is that shipments will be about one-half of the average for the past three years and may not exceed 6,000 cars.

Klamath County is conducting a potato disease control program inaugurated in 1946 in cooperation with the State Experiment Station and local growers. The most serious problem is the control of insects such as peach aphids carrying virus diseases. Considerable progress was made on this in 1946 by dusting with DDT carrying a small percentage of oil or sulfur. The two dusts that seem to be most effective in decreasing bug population in this area are D Fusol 4, which was found to be the best on experimental plots last year, and 5 per cent DDT with 2 per cent oil, which was considered second best. Additional trials with these materials or some variation from the originals are being carried out this year. Bug counts seem to be greatly reduced in these fields and dusting with these materials is being accepted by a number of growers as a good method of control. The Klamath Potato Growers' Association has adopted a 4-point program which they are publicizing and recommending to all growers in this area. These points are as follows: (1) Only seed of high quality should be used, preferably certified seed, and this should be thoroughly examined during cutting. (2) No land should be planted that may contain voluntary potatoes or be otherwise unfit for production of top quality potatoes. (3) All fields, certified or commercial, should be rogued sufficiently early to remove tuber perpetuated leaf roll plants or other diseased plants. Second or third roguings may be necessary. (4) Dusting should be undertaken with materials developed here, as stated above, if there is any suspicion of current spread of virus diseases. In addition, a 5th point is sometimes added which is: If virus disease, particularly leaf roll, current spread, is present in any quantity late in the season, fields should be defoliated to hasten maturity, harvested and immediately marketed before any necrosis may develop. It is believed by many growers that this program will be very helpful in preventing the spread of virus diseases and consequent deterioration in quantity and quality of potato production in this area. The general program is supervised very closely by Walter Jendrzewski, Assistant County Agent here, and Joe Schuh, consulting entomologist whose services are provided by county appropriation and Dr. John Milbrath, Assistant Pathologist in charge of potato diseases at Oregon State College. We believe this program is bearing fruit.

I might add that our acreage of certified seed has been reduced to some extent but to date a very high percentage has met field tests and



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References by potato growers using the Model PB-3 furnished on request. They will give you their actual experience with the use of this machine.

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it is possible that we may have more seed meeting certification requirements than was the case last year. After completion of certification here samples are grown in the Oceanside test plots in southern California further insuring seed stock free from disease. (Aug. 28.)—C. A. HENDERSON.

#### PENNSYLVANIA

Late blight is widespread and causing considerable loss on unsprayed or poorly sprayed potatoes. The following chemicals, Dithane, Fixed Coppers, and Bordeaux at the 8-4-100 strength have given satisfactory control when applied in sufficient amounts to cover the foliage. Our prospects are now good for an excellent crop on all well-sprayed fields. (Sept. 9.)—O. D. BURKE.

#### SOUTH DAKOTA

Potato digging has started in this area and the yield varies from fair to good. There was very little rain in July and August so the yield will be below that of last year. Estimates are for a yield varying from 75 to 175 bushels per acre. The stock that is being harvested now is being washed and sold to local wholesale houses and truckers. A few cars of certified Bliss Triumphs were shipped last week to Southern Florida.

There were 6,350 acres entered for certification this year compared with more than 7,000 acres last year. Rejections by the field inspector were very low since the majority of the seed planted was foundation stock shipped in from Wisconsin, Minnesota and North Dakota.

The seed this year will be about the size most desired by the growers. Our growers are planning to store the largest portion of the certified stock for winter delivery.

A referendum on a potato marketing agreement for the potato producing area in South Dakota will be held soon. The order has been published in the Federal Register and the final date for filing exceptions was the 2d of September. It is not expected that any action will be necessary by the committee, when appointed, on the 1947 crop since prices offered at the present time are well above support levels. (Sept. 9.)—JOHN NOONAN.

#### VERMONT

Indications, as of the 8th of September, point to a much smaller yield per acre than in 1946. Late planting caused by excessively wet spring conditions gave a bad start. Late blight, together with drought conditions in August, cut growth in many fields.

About 415 acres were entered for certification with "Kats" and

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Green Mountains accounting for a greater part of it. Houmas were the only others in any considerable acreage.

Very little virus disease was found and nearly 400 acres passed the second field inspection. No ring rot had been located to date during this season.

Whether or not because of the rather general use of DDT or for natural reasons, aphids were in general less abundant. (Sept. 11.)—HAROLD L. BAILEY.

#### MAINE

Every one, of course, is wondering about the production of the crop in Maine. I have no reason to question the government estimates, which will be revised on the 10th of September, for over a period of years these figures have been accurate. The southern end of Aroostook has experienced a severe late blight epidemic. The central and northern part has had some blight, but it has not affected the yield as yet. We are two weeks late, not only in our digging operations, but also regarding the size of the crop. Usually at this time of year less than a thousand acres have been harvested.

The use of DDT and the late season make it certain that vine killing must be generally practiced by most farmers in order to harvest their crops without danger of the green tops spreading blight and later causing bin rot. Practically every known top-killing material is being used in the county. Most of these chemicals are giving good results especially when a thorough coverage is secured. Sulphuric acid is being applied through custom work, but indications point toward the fact that the machines are not standing up under constant usage.

About 98 per cent of the farmers stayed within their average allotments. When it came to paying a cent for a hundredweight as a service fee, some farmers did not agree to do so. It is believed, however, that about 90 per cent of the farmers will eventually become eligible for price support under the AAA program.

Requests for approximately 500 Canadian workers have been made by farmers through the Farm Labor Office. It is expected that most orders can be filled. Digging will become general about the 22d of September. (Sept. 9.)—VERNE C. BEVERLY.

#### WASHINGTON

The Washington certified White Rose seed potato growers began their harvest as usual immediately after the 1st of September. The first seed harvested is being shipped to Argentina, South America. By the end of the harvest season at least 50,000 crates of White Rose will be

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shipped to the Argentine. The White Rose growers are harvesting normal crops, averaging approximately eight tons per acre.

There were 1,111 acres of seed potatoes that passed field inspection for certification. Eight hundred ninety-five of these were White Rose, the remaining acres being Netted Gems and other miscellaneous varieties.

The market for certified seed is good and the demand will no doubt increase during the next several months. Foundation seed will be scarce and will no doubt bring approximately \$5.00 per cwt. for Blue Tag this winter.

This past year over 6,000,000 sacks of potatoes from Idaho, Oregon and Washington, were used at the Northwest Dehydrating plant at Lynden, Washington, in supplying 1,640,000 pounds of dehydrated potatoes for the European relief program. (Sept. 8.)—HAROLD S. SCHAAD.

#### CANADA

Applications for field inspection of potatoes with the view of certification have increased from 7,896 in 1946 to 8,067 in 1947. The increases occurred in Prince Edward Island and British Columbia, respectively. On the other hand, the acreage entered is reduced from 66,665 in 1946 to 58,502 in 1947. In Manitoba the increase amounted to 232 acres, and in Saskatchewan to 16 acres. All other provinces showed decreases. (Aug. 15.)—J. W. SCANNELL.

#### ANNUAL MEETING

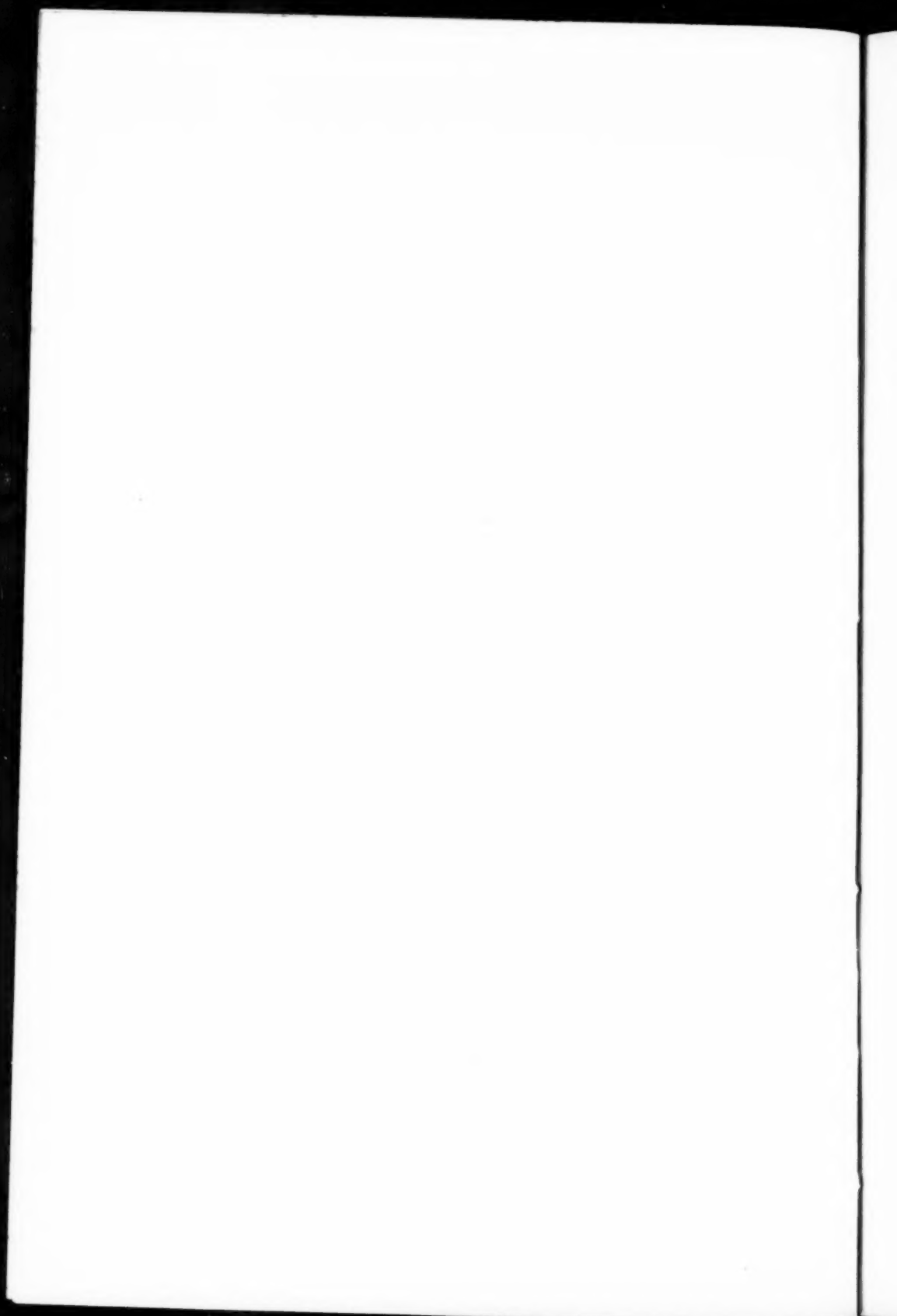
December 28-29-30, Chicago, Illinois

As announced in the August issue of the Journal, the annual meeting of the Potato Association of America will be held at the Palmer House, Chicago.

The committees as listed in the August issue have been changed somewhat and a final list will be printed in the October issue. It has been decided also to change the joint session with the American Society for Horticultural Science from Tuesday afternoon to Wednesday morning.

All copies of manuscripts or titles of papers should be submitted to Marx Koehnke of Alliance, Nebraska, on or before October 10 in order to be included in the official program of the American Association for the Advancement of Science.





# HUNGER SIGNS IN CROPS

Growing plants should be observed closely for signs which may denote plant-food starvation. Potatoes, for instance, will show their need for potash with leaves that have an unnatural, dark green color and become crinkled and somewhat thickened. Later on, the tip will become yellowed and scorched. This tipburn then will extend along the leaf margins and inward toward the midrib, usually curling the leaf downward and resulting in premature dying.

Valuable as this method of diagnosis has proven, it has its limitations owing to inter-relationships of nutrients in the plant and to other factors that might cause abnormalities. Recently it has been observed that when an application of a nutrient has not produced the expected results, a hardpan of impermeable layer in the soil may offer an explanation. Restricted root zone, reduction of capillary action, and limited quantities of oxygen lessen a plant's ability to absorb nutrients that might be in the soil and available if the hardpan were eliminated.

In determining fertility requirements, therefore, it may be well to consider not only the surface soil but also what is underneath. The greater the volume of soil in which plants can breathe, eat, and drink, the greater the insurance of a good crop.

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